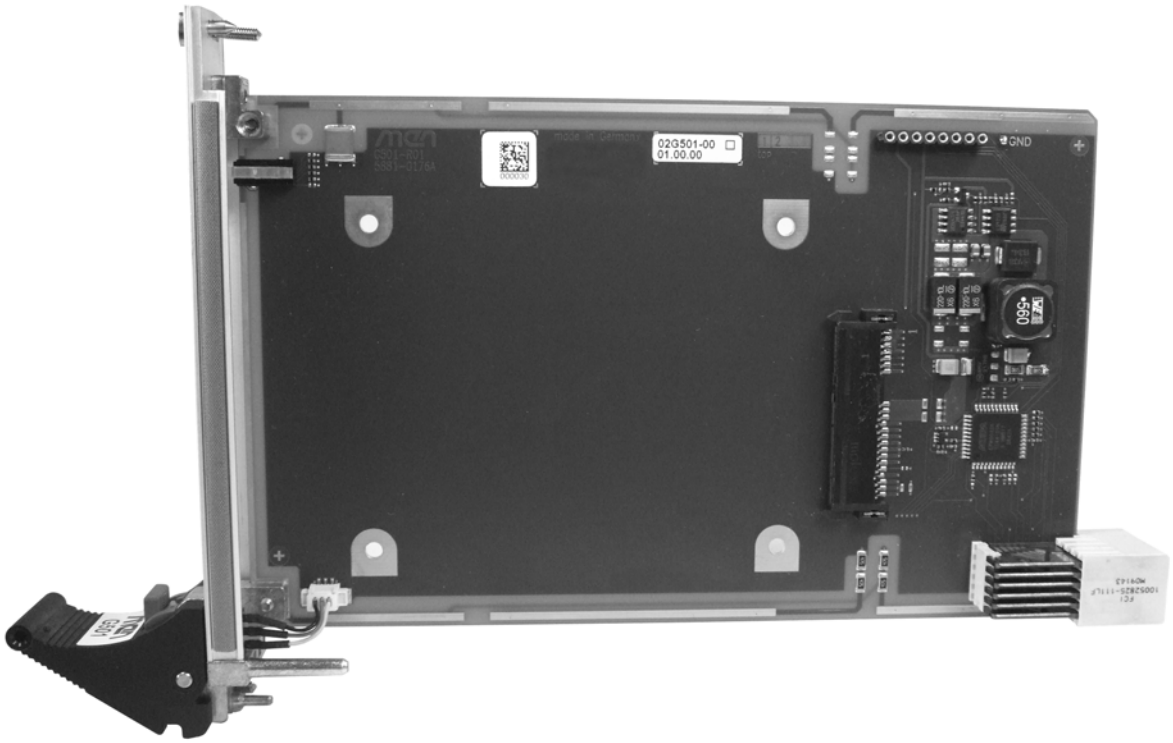
Embedded Solutions

G501 – 3U CompactPCI Serial® SATA HDD/SSD Shuttle



User Manual

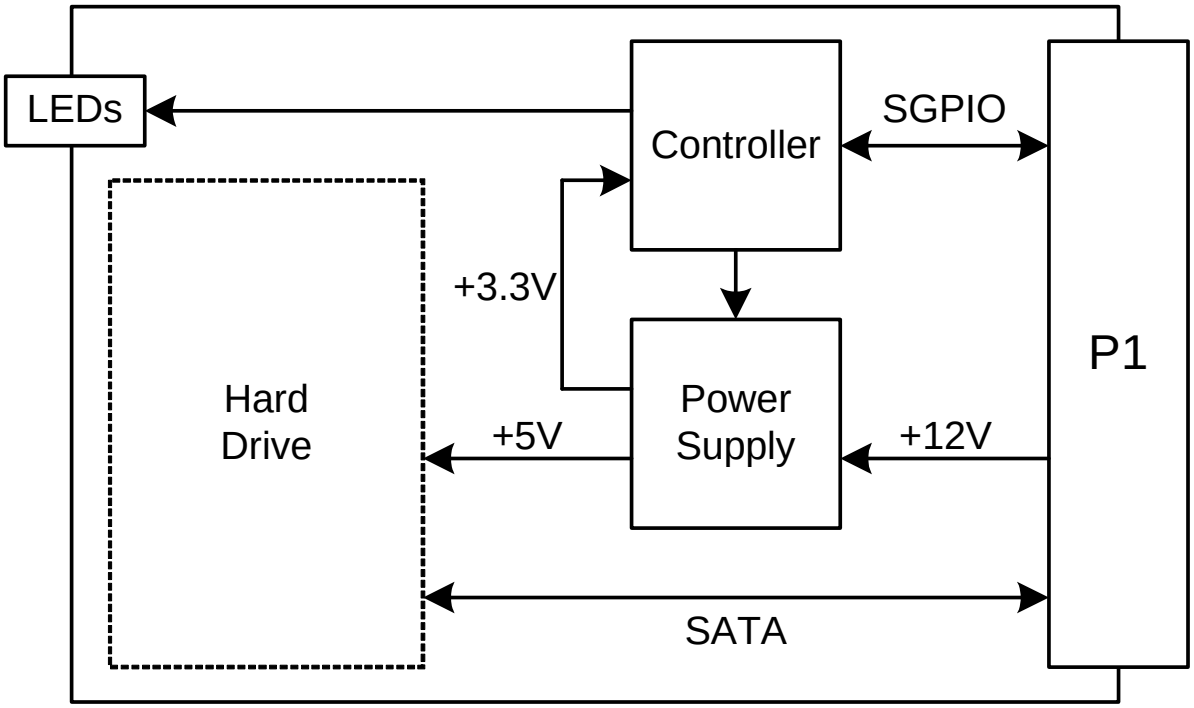
mikro elektronik
gmbh · nürnberg

G501 – 3U CompactPCI® Serial SATA HDD/SSD Shuttle

The G501 is a CompactPCI® Serial hard disk drive carrier board. It is designed to carry a 2.5" SATA hard disk drive (RAID level depending on the CPU) or a solid state drive.

The unit's front panel features four LEDs for the board's SGPIO status (used for the hot plug functionality) and the status of the internal controller's power supply.

Block Diagram



Technical Data

Mass Storage

- Serial ATA (SATA)
  - One port for onboard 2.5" hard disk drive or solid state drive
  - Transfer rates depending on HDD/SSD
  - RAID level depends on CPU board

External Interfaces

- 4 LEDs at front panel
  - 3 for the SGPIO status (for hot plug functionality)
  - 1 for the internal controller's supply voltage status

CompactPCI Serial

- Compliance with CompactPCI Serial PICMG CPCI-S.0 Specification
- Peripheral slot
- Host interface: one SATA and one SGPIO interface

Electrical Specifications

- Supply voltage
  - +12V (-25%/+10%), power consumption depending on HDD/SSD

Mechanical Specifications

- Dimensions: conforming to CPCI-S.0 specification for 3U boards
- Hot plug functionality (depending on CPU board).
- Weight: 125 g (without HDD/SSD)

Environmental Specifications

- Temperature range (operation):
  - -40..+85°C (depending on HDD or SSD; please refer to the HDD/SSD specifications for possible limits)
  - Airflow: min. 1.5 m/s
- Temperature range (storage): -40..+85°C
- Relative humidity (operation): max. 95% non-condensing
- Relative humidity (storage): max. 95% non-condensing
- Altitude: -300 m to + 3,000 m
- Shock: 15 g/11 ms
- Bump: 10 g/16 ms
- Vibration (sinusoidal): 2 g/10..150 Hz

MTBF

- 2.032.578 h @ 40°C according to IEC/TR 62380 (RDF 2000)

Safety

- PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers

Product Safety

Electrostatic Discharge (ESD)

Computer boards and components contain electrostatic sensitive devices. Electrostatic discharge (ESD) can damage components. To protect the board and other components against damage from static electricity, you should follow some precautions whenever you work on your computer.

- Power down and unplug your computer system when working on the inside.
- Hold components by the edges and try not to touch the IC chips, leads, or circuitry.
- Use a grounded wrist strap before handling computer components.
- Place components on a grounded antistatic pad or on the bag that came with the component whenever the components are separated from the system.
- Store the board only in its original ESD-protected packaging. Retain the original packaging in case you need to return the board to MEN for repair.

About this Document

This user manual describes the hardware functions of the board, connection of peripheral devices and integration into a system. It also provides additional information for special applications and configurations of the board.

The manual does not include detailed information on individual components (data sheets etc.). A list of literature is given in the appendix.

History

Issue	Comments	Date
E1	First issue	2010-03-22
E2	Updated structure of "technical data" section, added "CompactPCI Serial" block and MTBF, hot plug functionality now a standard feature, slight changes to technical data (supply voltage range, airflow)	2011-06-20

Conventions

This sign marks important notes or warnings concerning proper functionality of the product described in this document. You should read them in any case.

italics Folder, file and function names are printed in *italics*.

bold **Bold** type is used for emphasis.

`monospace` A `monospaced` font type is used for hexadecimal numbers, listings, C function descriptions or wherever appropriate. Hexadecimal numbers are preceded by "0x".

hyperlink Hyperlinks are printed in blue color.

The globe will show you where hyperlinks lead directly to the Internet, so you can look for the latest information online.

IRQ# /IRQ Signal names followed by "#" or preceded by a slash ("/") indicate that this signal is either active low or that it becomes active at a falling edge.

in/out Signal directions in signal mnemonics tables generally refer to the corresponding board or component, "in" meaning "to the board or component", "out" meaning "coming from it".

Vertical lines on the outer margin signal technical changes to the previous issue of the document.

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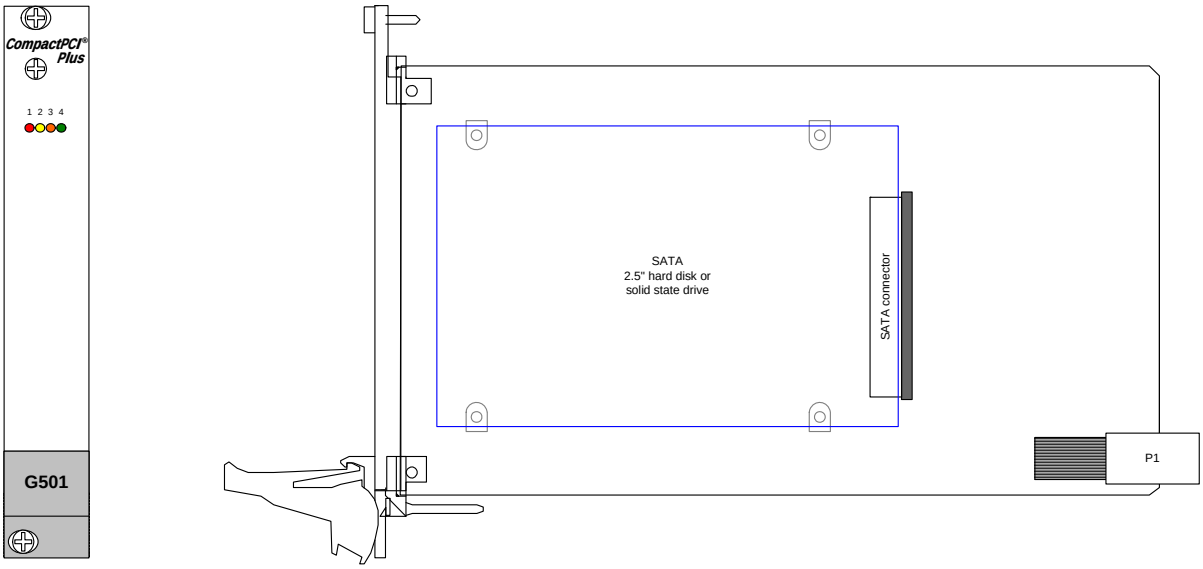
1 Getting Started

This chapter gives an overview of the board and some hints for first installation in a system.

1.1 Map of the Board

Figure 1. *Map of the board – front panel and top view*



1.2 Integrating the Board into a System

You can use the following check list when installing the board in a system for the first time and with minimum configuration.

☑ Power-down the system.

☑ Insert the G501 into a CompactPCI Serial peripheral slot of your CompactPCI Serial or hybrid system, making sure that the CompactPCI Serial connector is properly aligned.

Note: The peripheral slots of every CompactPCI Serial system are marked by a circle ○ on the backplane and/or at the front panel.

☑ Power-up the system.

2 Functional Description

2.1 Serial ATA (SATA) Interface

The G501 is a hard disk/solid state drive shuttle and features one serial ATA (SATA) interface controlled by the system's CPU board. You can connect a 2.5" hard-disk or solid state drive.

The SATA interfaces support transfer rates up to 300 MB/s.

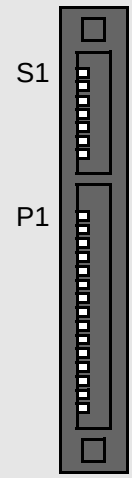
Table 1. *Signal mnemonics of SATA connector*

Signal	Direction	Function
+12V	out	+12V power supply
+3.3V	out	+3.3V power supply (optional)
+5V	out	+5V power supply
GND	-	Digital ground
SATA_RX+, SATA_RX-	in	Differential pair of SATA receive lines
SATA_TX+, SATA_TX-	out	Differential pair of SATA transmit lines

Connector type:

- 7- & 15-pin SATA receptacle connector, 1.27mm pitch

Table 2. *Pin assignment of SATA connector*



S1	GND
S2	SATA_TX+
S3	SATA_TX-
S4	GND
S5	SATA_RX-
S6	SATA_RX+
S7	GND
Key and spacing, separate signal and power segments	
P1	+3.3V (optional)
P2	+3.3V (optional)
P3	+3.3V (optional)
P4	GND
P5	GND
P6	GND
P7	+5V
P8	+5V
P9	+5V
P10	GND
P11	GND
P12	GND
P13	+12V
P14	+12V
P15	+12V

2.1.1 Installing a Hard Disk

MEN offers a 2.5" hard-disk drive for onboard installation. With a hard disk installed, the board still needs only one slot in the system.
See also Figure 1, Map of the board – front panel and top view, on page 8.

Please see MEN's website for ordering options.

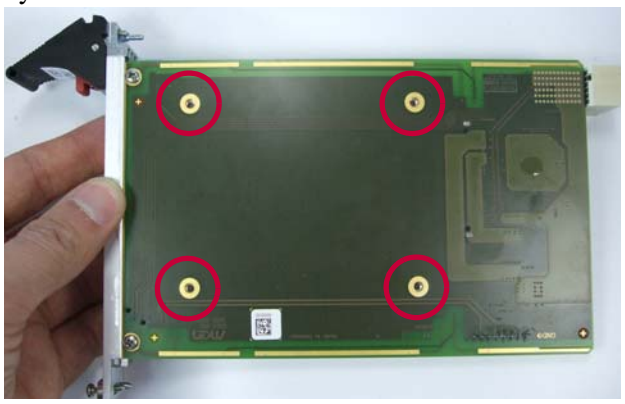
Perform the following steps to install a hard disk:

- ☑ Power down your system.
- ☑ Remove the G501 from the system.
- ☑ If another hard disk is already installed, follow the instructions given in Chapter 2.1.2 Removing a Hard Disk.

☑ Place the hard disk on the G501 as shown below with the connector at the rear of the hard disk aligned with the SATA connector on the G501.

☑ Firmly plug the hard disk into the SATA connector on the G501.

☑ Fasten the hard disk to the board from the other side using the four screws supplied with the G501. Apply thread locker to ensure the screws are not loosened by vibrations.



2.1.2 Removing a Hard Disk

To remove a hard disk from the G501 simply remove the four screws holding the hard disk in place (as shown directly above) and then unplug the hard disk from the G501's SATA connector.

2.2 CompactPCI Serial Interface

The G501 supports the standard CompactPCI Serial interface (PICMG CPCI-S.0).

For full CompactPCI Serial SATA connection only the P1 connector is needed, therefore the board only has a P1 connector to the bus.

Connector type of P1:

- 72-pin Airmax VS 4 pair, right angle header, 6 IMLA with end walls

The pin assignment of the P1 connector as defined in the CompactPCI Serial (PICMG CPCI-S.0) specification will not be repeated here.

2.3 Front-Panel Status LEDs

The G501 has four status LEDs at its front panel.

Table 3. *Front-panel status LEDs*

LED	Description
1	Hot-plug / Error*
2	Locate*
3	Activity*
4	Power supply status (ON = no undervoltage)

* The functionality of LEDs 1 through 3 is dependent on the CPU board.

3 Appendix

3.1 Literature and Web Resources

- G501 data sheet with up-to-date information and documentation: www.men.de/products/02G501-.html

3.2 Finding out the Board's Article Number, Revision and Serial Number

MEN user documentation may describe several different models and/or hardware revisions of the G501. You can find information on the article number, the board revision and the serial number on two labels attached to the board.

- **Article number:** Gives the board's family and model. This is also MEN's ordering number. To be complete it must have 9 characters.
- **Revision number:** Gives the hardware revision of the board.
- **Serial number:** Unique identification assigned during production.

If you need support, you should communicate these numbers to MEN.

Figure 2. *Labels giving the board's article number, revision and serial number*